



Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

An ISO 9001
Company

ENQUIRY

NOTICE INVITING TENDER

Phone: +91 431 257 76 53
Fax : +91 431 252 00 31
Email : skaruna@bheltry.co.in
Web : www.bhel.com

TWO PART BID

Tender to be
submitted in two Parts

Enquiry Number:

2851300023

Enquiry Date:

28.10.2013

Due date for submission of quotation:

18.11.2013

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.

Please note that under any circumstances both **delayed offer** and **late offers** will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.

Item	Description	Quantity	Delivery Required	Delivery Terms Required
10	Tube End Scarfer	20 Nos.	End January 2015	F.O.R, BHEL Stores, POWER EQUIPMENT FABRICATION PLANT, BHARAT HEAVY ELECTRICALS LIMITED, Mundipar- 441804, Sakoli Taluk, Bhandara District, Maharashtra State.
20	Tube End Scarfer	30 Nos.	6 Months from PO date	F.O.R ,BHEL Stores, HIGH PRESSURE BOILER PLANT, BHARAT HEAVY ELECTRICALS LIMITED, Tiruchirappalli- 620014, Tamilnadu State.
30	Tube End Scarfer	05 Nos.		

The above items as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or <http://tenders.gov.in>)

Important points to be taken care during submission of offer:-

1. Checklist No. **IND 01A / IMP 01 and Annexure-II (Details of Company Performance)** as applicable to the vendor to be filled in and enclosed along with the offer failing which, their offer will not be considered for evaluation.
2. The L1 shall be evaluated on Single Package basis consisting of the above three items (Sl. 10-30) i.e. overall L1. Hence the supplier has to quote for all the three items else the offer would not be considered for evaluation.
3. EMD for this Tender will be Rs. 2,00,000/-
4. All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.
5. The Period required for completion of Erection & Commissioning of the above items shall be 10 days from the date of intimation from BHEL requesting supplier to depute Service Engineers about site readiness.

BHEL's General guidelines / instructions (refer **MM / CE / GENL / 001 - EMD**) including bank guarantee formats and list of consortium banks, commercial terms check-list can be downloaded from BHEL web site <http://www.bhel.com> or from the Government tender website <http://tenders.gov.in> (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference "**2851300023**".

Yours faithfully,
For **BHARAT HEAVY ELECTRICALS LIMITED**

Tenders should reach us before 14:00 hours on the due date
Tenders will be opened at 14:30 hours on the due date
Tenders would be opened in presence of the tenderers who
have submitted their offers and who may like to be present

Engineer / Capital Equipment / MM

**TECHNICAL SPECIFICATION FOR
PORTABLE PNEUMATIC TUBE END SCARFING MACHINE
PART -A**

S.No	BHEL Specification	Vendor's Offer
1.0	QUALIFYING CRITERIA	
1.1	The BIDDER / VENDOR (OEM) shall have a minimum of FIVE Years of Continuous Experience in the Design, Manufacture & Supply of Special Purpose / Custom Built Pneumatically operated portable machines for metalworking.	
1.2	Only those vendors (OEMs), who have supplied and commissioned atleast TWO numbers of pneumatically operated heavy duty portable tube end chamfering machines similar to the machine specified under Part B, in the past ten years (as on date of opening of Tender) and such machine is presently working satisfactorily for more than one year after commissioning (as on date of opening of Tender) should quote.	
1.3	Vendor has to submit atleast one Performance Certificate from their customers, for satisfactory performance of pneumatically operated heavy duty portable tube end chamfering machines similar to the machine specified under Part B, for a minimum period of one year (as on date of opening tender). For obtaining the Performance certificate, a suggestive format is provided.	

2.0	INFORMATION TO BE PROVIDED BY VENDOR	
2.1	The BIDDER/VENDOR to furnish Reference List of Customers, with full address, details of contact person, where Special Purpose / Custom Built Pneumatically operated portable machine (for metalworking) have been supplied in the past.	
2.2	Details of Special Purpose / Custom Built Pneumatically operated portable machines for metalworking supplied to other BHEL units, if any. (Year of commissioning, Application, Type)	
2.3	Details on SERVICE-AFTER-SALES set-up in India including the Address of Agents /Service Centres in India.	
2.4	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

Suggestive Format of Performance Certificate:

The performance certificate should be produced **on Customer's Letter Head.**

PERFORMANCE CERTIFICATE

- 1 Supplier of the machine
- 2 Make & Model of the M/C
- 3 Month & Year of Commissioning
- 4 Application for which M/C is used
- 5 a. Application
b. Machining capability
- 6 Performance of the Machine
(Strike off whichever is not applicable) Satisfactory / Good / Average / NotSatisfactory
- 7 After sales service
(Strike off whichever is not applicable) Satisfactory / Good / Average / NotSatisfactory
- 8 Any Other remarks

Date:

Signature & Seal of the Authority
Issuing the Performance Certificate

**TECHNICAL SPECIFICATION FOR
PORTABLE PNEUMATIC TUBE END CHAMFERING MACHINE
PART - B**

S.No	Description	BHEL Specification	Vendors Offer
1.0	PURPOSE/ FUNCTION	The equipment is to be heavy duty portable machine used for the edge preparation of rough flame-cut TUBE Ends in tubular panels/coils of High Pressure Boilers. The flame-cut ends will be of hardened and irregular in nature in the plane of cut.	
2.0	Tube end preparation - requirements		
2.1	Tube OD Chamfering	Outside Beveling on the tubes to get a 37.5° and 45.0° angle for welding. All the above styles shall have a land of 1.0 mm to 2.0 mm in the edge preparation.	
2.2	Facing	End Facing of Tubes, i.e. to get a square cut face with smooth finish.	
2.3	I.D. Boring	Internal straight boring in the I.D. of tubes to a depth of 25mm from the tube end face with a merging taper of 30°	
2.4	Accuracy	Face out : +/- 0.1 mm Beveling Angle : +/- 0.5 degree	
2.5	Machining Mode	Any of the above two operations are to be done simultaneously.	
3.0	Job Specification		
3.1	Jobs	Tube ends of Tubular Panels, Tubular Coils, Loose Tubes	
3.2	Tube ODx Th Range of Tubes	Tube OD: 38.1 x Th. 3.6 to 10.7 Tube OD: 41.3 x Th. 4.0 to 8.2 Tube OD: 42.4 x Th. 4.0 to 8.6 Tube OD: 44.5 x Th. 4.0 to 8.7 Tube OD: 51.0 x Th. 4.0 to 11.0 Tube OD: 54.0 x Th. 3.6 to 12.5 Tube OD: 63.5 x Th. 4.0 to 7.1	
3.3	Wall Thickness	3.6 mm to 12.5 mm	
3.4	Tubular Panels	Tube dia. 38.1mm and Pitch 50.8mm, Tube dia. 41.3mm and Pitch 54mm in tubular panels.(Minimum Pitch between centre of tubes 50.8 mm)	

S.No	Description	BHEL Specification	Vendor's Offer
3.5	Material	i) CARBON STEEL : SA 192, SA 209 Gr. T1, SA 210 Gr.A1/ Gr.C (ASTM) ii) ALLOY STEEL: SA 213 Gr.T2, T11, T12, T22, T91,T92 (ASTM) iii) STAINLESS STEEL: SA 213 304H, 316L, 347H (ASTM)	
3.6	Tube End Condition	The tube ends of tubular panels are flame cut ends that will be of irregular and hardened in nature.	
3.7	Width at clamping area	Equipment shall have uniform width from bottom of the clamping jaw to spindle top. The width shall not exceed 90 mm.The width to be suitable enough to accommodate within the pitch distance for tube end chamfering. Vendor to specify the width in the offered machine.	
4.0	Cutting Tools, Tool Holders& Job Clamp Sizes		
4.1	O D Clamping Sizes (7 sizes)	The machine shall be capable of clamping tubes with OD 38.1mm /41.3mm /42.4mm / 44.5mm 51.0mm /54.0mm / 63.5mm	
4.2	Cutting Tool	HSS Tool Bits (HSS3,HSS with COBALT inclusion)Tools should be suitable for machining gas cut ends of alloy steel tubes with maximum wall thickness 12.5 mm. Cutting speed 15 to 20 m/min	
4.3	Tool Bits configuration	a) 37.5° for O.D bevelling b) Facing c) I.D straight boring for a depth of min. 25 mm from tube end face with merging taper of 30°	
4.4	Cutting Tool Bits Sample drgs.	The cutting tool bits to be offered as per the drawings given below: Serrations for tool cutting bits for gripping in tool holder slots to be as per the drawings. a) 40-T-36-24296-1 – 45° chamfer b) 40-T-36-24168-0 – 37½° chamfer c) 40-T-36-23975-0 – Facing tool d) 40-T-36-23978-0 – ID boring tool	
4.5	Tube Holding clamps	a) 40-T-50-25962-0 – Top Clamp b) 20-T-50-22846-4 – V Block	
4.6	Tool Holders	10-T-48-15152-1– Tool Holder	
4.7	Cutting Tools	Tool Holders, Tool Bits for Cutting Operations mentioned under 5.2, 5.3, 5.4, and 5.5 to be offered Item wise with quantity.	

S.No	Description	BHEL Specification	Vendor's Offer
5.0	Machine Output Ratings:		
5.1	Spindle cutting Speed	Spindle RPM around 75 to 170 rpm for maximum power at an air inlet pressure of 60-70 psi.	
5.2	Feed	Feed for maximum thickness on Alloy steel tubes to be specified by Vendor	
5.3	Spindle Stroke	25 mm. Spindle should be wobble free at maximum stroke position during working.	
5.4	Spindle Torque	Torque shall be sufficient to cut the above materials in gas cutting edges at an air inlet pressure of 60-70 psi. Vendor to specify.	
5.5	Noise Level	Suitable silencers and mufflers to be provided to minimize the noise level.	
5.6	Productivity	Equipment to be capable of edge preparing not less than 12 tube ends per hour on Tube OD 38.1mm x Thick 8.0mm / T11 or T22 – Gas cut ends with 5mm excess length.	
6.0	Machine Configuration:		
6.1	Machine construction	The equipment shall be of compact and robust construction with high output air-motor, to deliver a high cutting torque for a continuous duty, to meet the specific job application.	
6.2	Machine Operation	Pneumatically Operated	
6.3	Compressed Air Pressure	60 to 70 psi	
6.4	Machine Body	Steel Fabricated body	
6.5	All pneumatic piping & fittings	Metallic Pipes & fittings. Vendor to specify	
6.6	Base of Machine	Proper base shall be provided suitable for placing the machine on floor (standing steady due to self-weight)	
6.7	Lifting Hook	A suitably designed Lifting Hook shall be provided at the top of the machine, for handling by EOT Crane and ensure equilibrium of machine geometry.	
6.8	Tool Feed	Manual smooth tool feeding through a Hand Wheel without reverse load/Back force. The operator should be able to give feed effortlessly.	

S.No	Description	BHEL Specification	Vendor's Offer
6.9	Job/Tube Clamping	Clamping of tubes shall be on O.D by pneumatic clamping and has to be actuated with a separate locking Lever. The clamping to be rigid enough to hold the tube without slipping while machining. The air pressure shall be at 60 to 70 psi. Vendor to specify the clamping force.	
6.10	Tube clamps	Suitable base 'V' clamps for OD clamping for varying tube sizes given under Sl.No. 4.1 as per Drg. No. 40-T-50-25962-0 – Top Clamp Drg. No. 20-T-50-22846-4 – V Block	
6.11	Tube Centring	To be ensured by pneumatic clamping system by means of suitably hardened clamp blocks. Hardness level to be mentioned in the offer.	
6.12	Machine Spindle	Hardened and Ground.Vendor to Specify	
6.13	Location of Parts	Location of Air Motor, Silencer, FRL Unit, etc. shall be such that they do not interfere with the job surface, when the equipment is engaged. The arrangement shall be convenient for the operator.	
6.14	Silencers & Mufflers	The location of mufflers & silencers should be properly routed and positioned so that it does not hinder the operation. Vendor should submit the Line diagram for the same.	
6.15	Internal Construction of the equipment	All gears, Worm wheels, worm, bolts etc shall be made of high tensile strength to withstand the forces during operation. The assembly shall give a smooth performance. Vendor to provide details of the internal parts of the equipment.	
6.16	Weight of single unit	Around 225 kg.	
7.0	Air Motor:		
7.1	Air Motor	Geared Multi Vane Air Motor	
7.2	Air Motor Power at Output shaft	Air motor power not less than 4.0 kW at an air inlet pressure of 60-70 psi through a 3/4" air hose at the output shaft. Vendor to confirm.	
7.3	RPM	RPM at max. power of output shaft to be specified by Vendor.	
7.4	Stall Torque	Not less than 500 Nm	
7.5	Power / Torque Characteristics	Air Motor Power / Torque characteristics w.r.t rpm / air pressure to be provided with the offer.	
7.6	Gear Ratio	Reduction Gear Ratio – Vendor to specify	

S.No	Description	BHEL Specification	Vendor's Offer
7.7	Lubrication oil consumption rate for Air motor	Lubrication oil consumption rate of the air motor should be minimum; Vendor to specify drops per minute. Vendor to also specify the lubrication oil specification.	
7.8	Speed Regulation	Air motor shall be provided with an Air regulator to select suitable spindle speed.	
8.0	Pneumatic Circuit:		
8.1	Air Connection	Air connection through 3/4 inch hoses at a pressure of 60-70 psi shall be provided by BHEL. The equipment to be suitably designed.	
8.2	Air control valves	Control valve for air motor shall be separate from Control valve for clamping cylinder. Pneumatic circuit line diagram to be provided.	
8.3	Air Consumption	Air consumption pattern shall be specified.	
8.4	Filter, Regulator & Lubricator (FRL Unit)	A suitable capacity Air Filter, Regulator & Lubricator unit with metallic protective casing shall be mounted on the equipment.	
8.5	Air Couplings	Two sets of quick dis-connect couplings (size 3/4 inch) are to be provided with the equipment, for air hose connection.	
9.0	Makes of components:		
9.1	Geared Multi Vane Air Motor	Ingersoll Rand / San-ei Seiki Seisakushu Co. Ltd / Atlas Copco. Vendor to provide details.	
9.2	Bearings	SKF/INA FAG/IKO/TIMKEN/NTN	
9.3	All pneumatic components	FESTO/SMC	
9.4	F R L Unit	FESTO/SMC	
9.5	Silencer & Mufflers	FESTO/SMC	
9.6	Pneumatic Valves	FESTO/SMC	
9.7	SEALS	SKF/PARKER/MERKEL/HALLITE/SMC/FESTO	
9.8	Pneumatic Hoses	Poly Urethane - FESTO/SMC	
9.9	General	Makes of any other unspecified bought out items shall be specified by Vendor and such makes shall be acceptable to BHEL	

S.No	Description	BHEL Specification	Vendor's Offer
10.0	Painting:		
10.1	Paint	Poly Urethane	
10.2	Colour	Apple Green Colour, RAL 6011	
11.0	Spares:		
11.1	Main Equipment	Complete List of Spares including Air Motor Bearings, Seals, Bushes, Set of gears, Spindle, Air Cylinder, Air Valve for Clamping&Spindle rotation, Tool holders etc. for two years of trouble free maintenance may be listed item wise with quantity.	
12.0	Operation and Maintenance Manuals:		
12.1	O & M Manual Details	Manuals shall contain the following details: a) Blow-up details of assembly / dismantling, part numbers with part description (detailed sub drawings of machine parts) for Maintenance, Safety Instructions while using, b) Operating Sequence for using the equipment. Trouble Shooting Chart. c) Catalogue of all bought out items. d) Lubrication schedule. e) Preventive Maintenance check list. f) Tool holder drawings. g) Tool insert details h) Clamp bases drawings	
12.2	No of Copies of Manuals	One Hard copy and One soft copy in CD/DVD for each machine	
12.3	Language	English	
13.0	Pre-dispatch Inspection:		
13.1	Inspection at Vendor's works	Equipment shall be offered for inspection before dispatch at Supplier's works. The inspection will be carried out by BHEL Engineers. The performance of the machine, makes, spares and The tubes shall be supplied by BHEL.	
14.0	Commissioning:		
14.1	Commissioning at BHEL works	Supplier's representative shall be deputed for commissioning and performance prove-out of the equipment at BHEL works.	

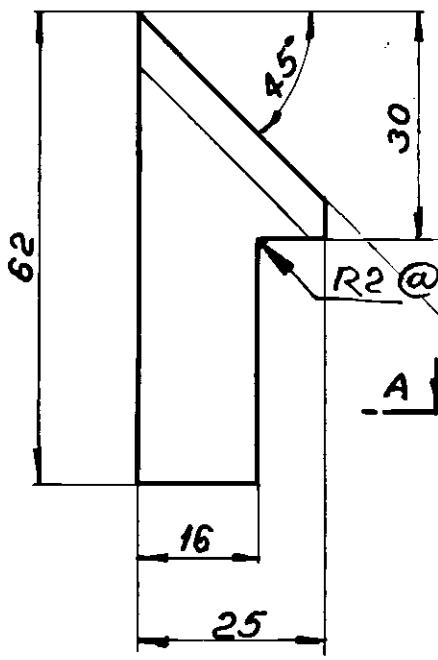
S.No	Description	BHEL Specification	Vendor's Offer
14.2	Prove out Trials	Capability: Tube OD: 51mm x Th. 11mm – Alloy steel (T22) with gas cut edges – 45° chamfer.	
14.3	Prove out Trials	Productivity:12 tube ends per hour on Tube OD 38.1mm x Thick 8.0mm / T11 or T22 – Gas cut ends with 5mm excess length for three hours.	
15.0	Training:		
15.1	Training	Training on Operation and Maintenance of the equipment shall be provided for a minimum period of two days	
16.0	Guarantee:		
16.1	Guarantee	The equipment shall be guaranteed for a minimum period of 12 months from the date of commissioning or 18 months from the date of dispatch.	
17.0	General:		
17.1	Technical Details	All technical details of the bought out items, circuit diagrams, general arrangement drawings to be provided with the offer.	
17.2	Drawing approval	Drawings to be submitted by supplier for approval prior to manufacturing, in case of on order.	

Enclosures:

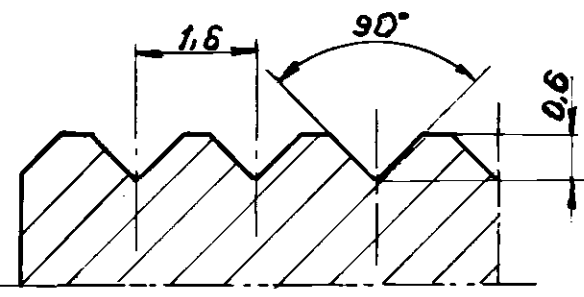
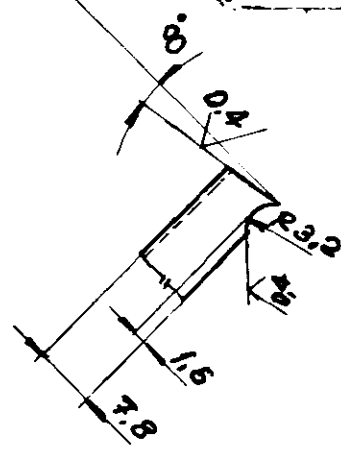
1. 40-T-36-24296-1 – 45° chamfer
2. 40-T-36-24168-0 – 37½° chamfer
3. 40-T-36-23975-0 – Facing tool
4. 40-T-36-23978-0 – ID boring tool
5. 40-T-50-25962-0 – Top Clamp
6. 20-T-50-22846-4 – V Block
7. 10-T-48-15152-1 – Tool Holder

A	DATE	ALTERED
	12.3.86	<i>BKR</i>
ZONE	CHECKED	
@	R2-ADDED	

1.6 / D.4 /



TOLERANCE FOR UNTOLERANCED DIMENSIONS	
UPTO 6 MM	= ±0.1 MM
> 6 UPTO 120 MM	= ±0.2 MM
MORE THAN 120 MM	= ±0.3 MM
ANGULAR TOLERANCE	= ±0.5 DEG.
CHAMFER	= ±0.5 MM



SECTION: 'A-A'
SCALE: 10:1

HARDEN AND TEMPER TO 62^{±1} HRC

TOOL No : 36-10333-00
45°

7.8 x 25 x 62		IS 1570 T 75 W18 Co6 Cr 4 V 1 Mo 75		0.08					
NO. OF PIECES	DESCRIPTION	SEM. PRO./SEQ. NO.	INT. MAT. / SEQ. NO.	FINAL MATERIAL	SCRAP SORT	NET wt (kg)	GROSS wt (kg)	DRAWING NO.	ITEM NO.
FIRST ANGLE	SCALE	DRAWN		TOTAL NET wt (kg)					
	1:1	CHECKED		TYPE					
ALL DIMENSIONS IN MILLIMETRES		APPROVED		COMPNT. No.		2-29.04-04-001			
		DATE		W.C. 5999		OLD DRG. NO.			

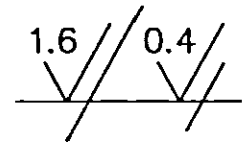


CAUTION
THE INFORMATION CONTAINED IN THIS DRAWING IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LTD., BOILER PLANT UNIT, TIRUCHY-14 AND SHALL NOT BE USED WITHOUT THEIR EXPRESS WRITTEN PERMISSION IN ANY FORM OR PART THEREOF FOR ANY OTHER PURPOSE THAN FOR WHICH IT IS SENT TO YOU.

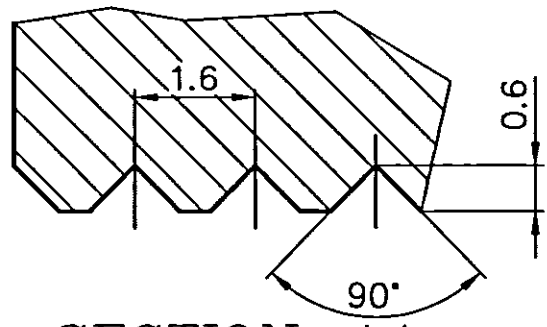
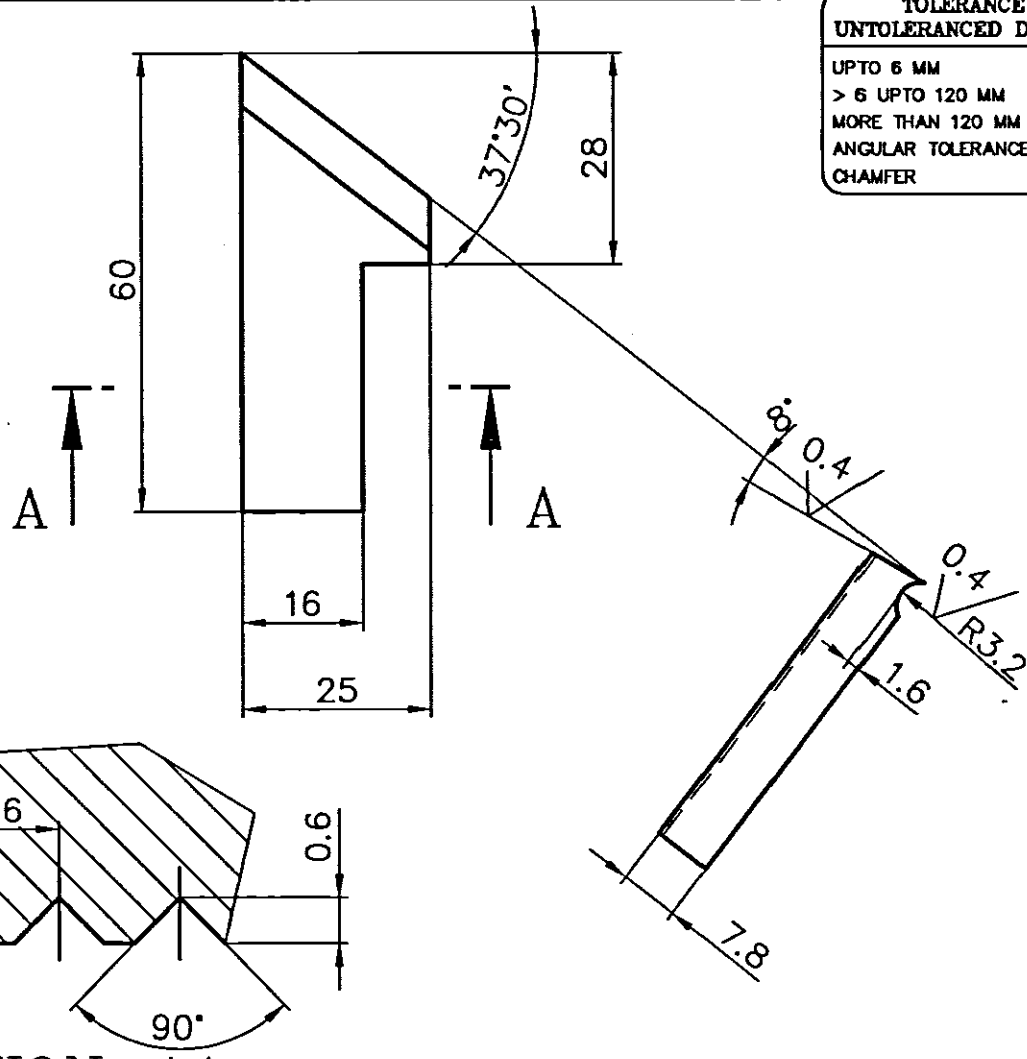
TITLE
CHAMFERING TOOL
FOR PORTABLE ENDCUT SCARFING MACHINE

DRAWING NO.	REVISION
40.T.36.24296	A

HARDEN & TEMPER TO
 ± 1
 62 HRC.



TOLERANCE FOR UNTOLERANCED DIMENSIONS	
UPTO 6 MM	= ± 0.1 MM
> 6 UPTO 120 MM	= ± 0.2 MM
MORE THAN 120 MM	= ± 0.5 MM
ANGULAR TOLERANCE	= ± 0.5 Deg
CHAMFER	= ± 0.5 Deg



SECTION-AA
 SCALE: -10:1

COMP.DRG.NO - **TOOL NO: 36-63005-00**

COMP.DESC TUBES

TYPE/GROUP 11 W.C: -4393 USE WITH: 48-14110-00

7.8x25x60	T75 W18	IS 1570 Co6Cr4V1Mo75	0.1						
NO. OF PIECES	NAME-DIMENSIONS	SEMI-PRODUCT	FINAL MATERIAL	INITIAL MATERIAL	SCRAP SORT	NET WT (KG)	GROSS WT (KG)	DRAWING NO.	ITEM NO.

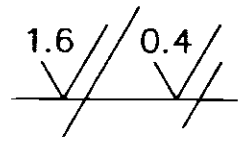
REMARKS KSR/SSP/G TOTAL NET WT(kg)

SCALE 1:1 10:1	DRAWN	R.VINODH KUMAR	TRANS. COPY NO.	ALTERATIONS	DATE	SIGNATURE	ALTERATION INDEX
	CHECKED	<i>N. S. S.</i>					
	APPROVED	<i>S. Subramanian</i>					
	STDS. OFFICER						
	DATE	10.05.05					

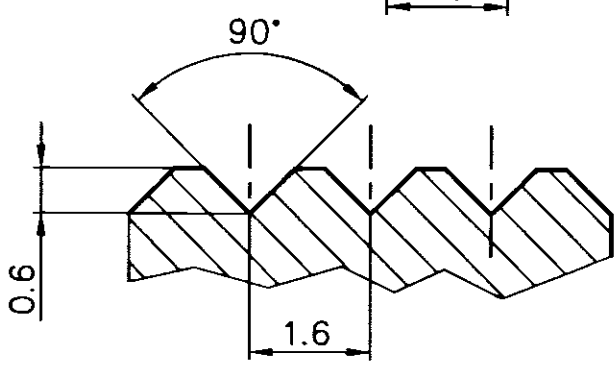
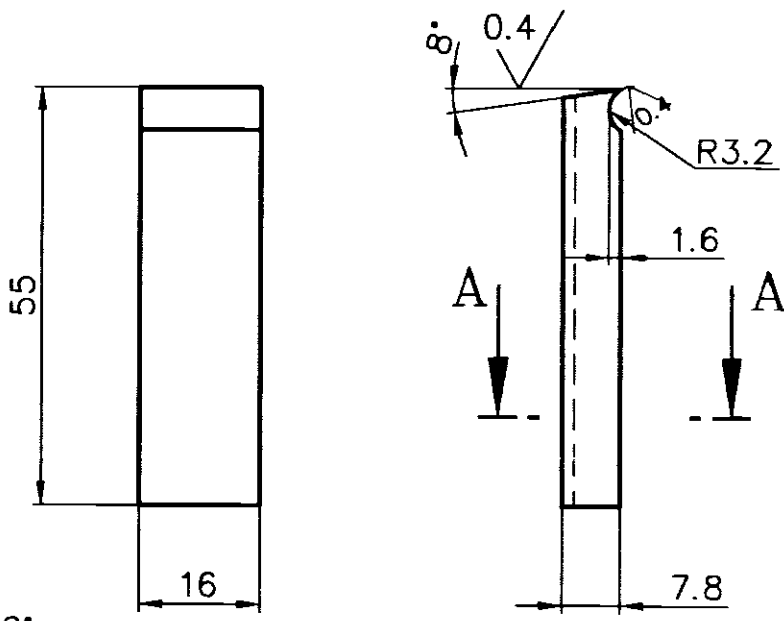


TYPE GROUP OLD DRG. RETRACED NEW DRG.
 TITLE CHFRTOOL0375D08161NT DRAWING No. **40-T-36-24168**

HARDEN & TEMPER TO
 ± 1
62 HRc.



TOLERANCE FOR UNTOLERANCED DIMENSIONS	
UPTO 6 MM	= ± 0.1 MM
> 6 UPTO 120 MM	= ± 0.2 MM
MORE THAN 120 MM	= ± 0.5 MM
ANGULAR TOLERANCE	= ± 0.5 Deg
CHAMFER	= ± 0.5 Deg



SECTION-AA
 SCALE: -10:1

COMP.DRG.NO	-	TOOL NO: 36-10315-00 M/C PORTABLE END CUT SCARFING
COMP.DESC	TUBES	
TYPE/GROUP	11 W.C: -4395	

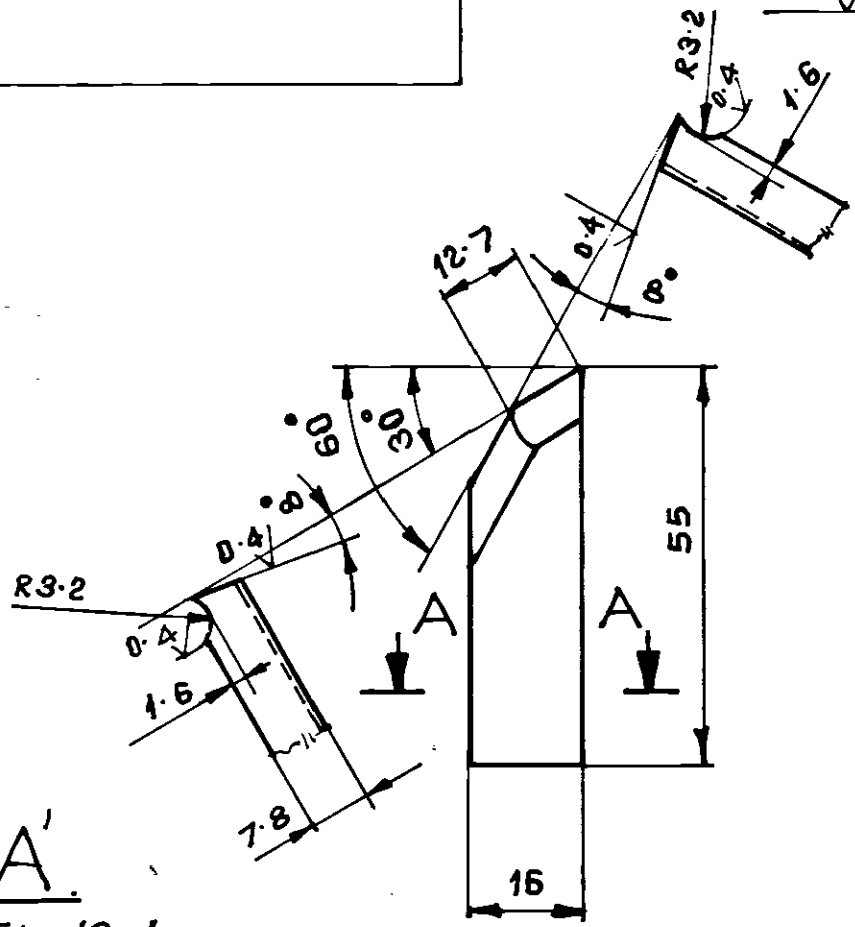
7.8x16x55	IS 1570 T75 W18Co6Cr4	V1 Mo75	0.06						
NO. OF PIECES	NAME-DIMENSIONS	SEM-PRODUCT	FINAL MATERIAL	INITIAL MATERIAL	SCRAP SORT	NET WT (KG)	GROSS WT (KG)	DRAWING NO.	ITEM NO.

REMARKS				TOTAL NET WT(KG)				
SCALE 1:1 10:1	DRAWN	R.VINODH KUMAR		ALTERATIONS		DATE	SIGNATURE	ALTERATION INDEX
	CHECKED							
	APPROVED							
	DATE	10.05.05		FRAME COPY NO.				

 293-092	TYPE	GROUP	OLD DRG.	NEW DRG. RETRACED
	TITLE		DRAWING No.	
	FACING TOOL		40-T-36-23975	

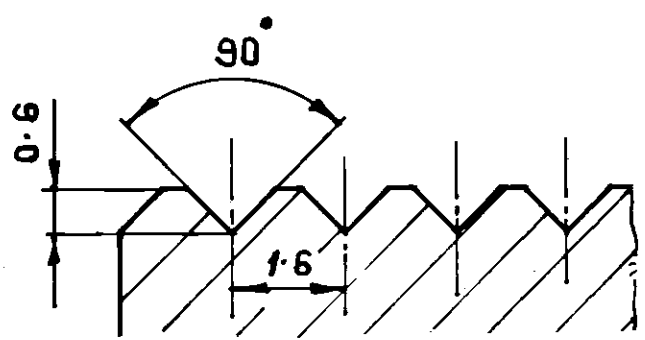
HARDEN & TEMPER TO 61 \pm 1 HRC.

1.6 / 0.4



SEC.-A-A'

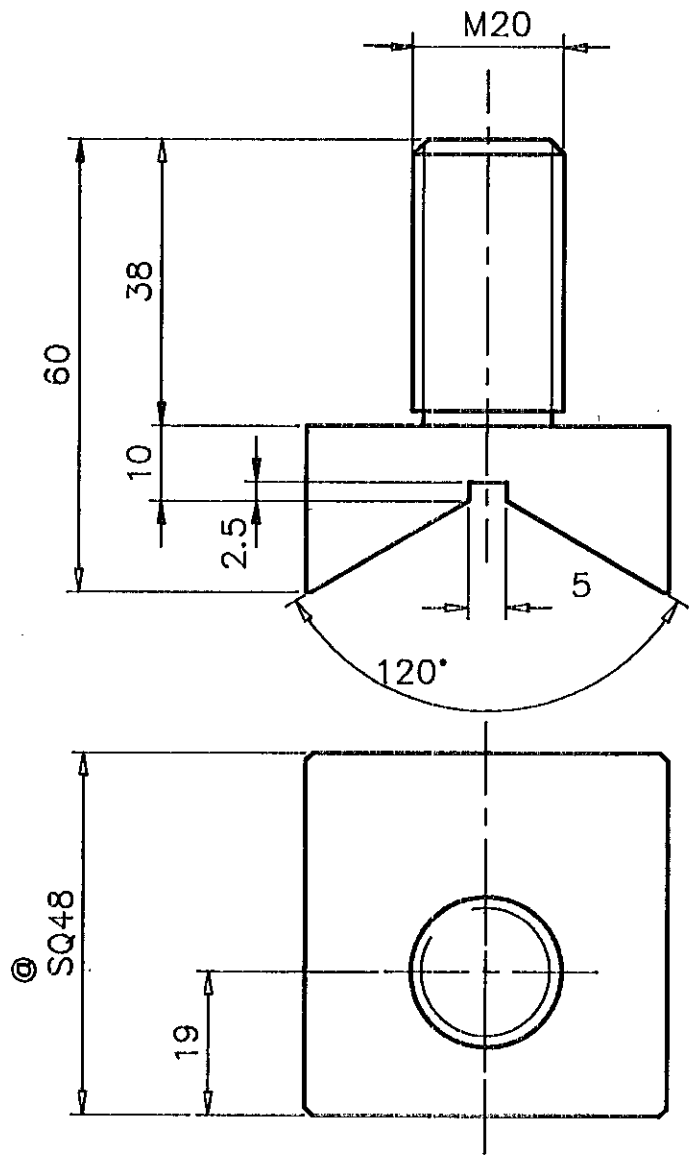
SCALE:- 10:1



COMP. DRG. No.		-		TOOL No: 36-10318-00					
COMP. DES.		TUBES.							
TYPE / GROUP		11 WC: 4395							
USE WITH		48-14114-00							
7.8 x 16 x 55		IS 1570 T75 W18 Co 6 Cr 4 V 1 Mo 75				0.06			
NO OF PIECES	NAME - DIMENSIONS	SEMI-PRODUCT	FINAL MATERIAL	INITIAL MATERIAL	SCRAP SORT	NET Wt (kg)	GROSS Wt (kg)	DRAWING NO.	ITEM NO.
REMARKS FOR TUBES. WC: 4395				TOTAL NET Wt (kg)					
SCALE	DRAWN / TCD	KSR / SMRAJA		ALTERATIONS		DATE	SIGNATURE	ALTERATION INDEX	
1:1	CHECKED								
10:1	APPROVED	V.C							
	STOS. OFFICER			TRANS. COPY NO.					
	DATE	100697		M/C PORTABLE END CUT SCARFING					
TYPE		GROUP		OLD DRG.		NEW DRG.			
TITLE		EDPRTOOLENDS CARFING X		DRAWING NO.		40-T-36-23978			
33-116									

HARDEN & TEMPER TO 28HRc
CHAMFER SHARP EDGES.

3.2/
✓/




TOLERANCE FOR UNTOLERANCED DIMENSIONS
 UPTO 6 MM = ±0.1 MM
 > 6 UPTO 120 MM = ±0.2 MM
 MORE THAN 120 MM = ±0.5 MM
 ANGULAR TOLERANCE = ±0.5 DEG
 CHAMFER = ±0.5 (R)

COMP.DRG.NO			TOOL NO- 50-10330-00	
COMP. DES.	PIPES			
TYPE&GROUP	80	W.C- 4393		

48x48x60			IS 1875 CL 4	0.5					
NO. OF PIECES	NAME-DIMENSIONS	SEMI-PRODUCT	FINAL MATERIAL	INITIAL MATERIAL	SCRAP SORT	NET WT (KG)	GROSS WT (KG)	DRAWING NO.	ITEM NO.

REMARKS				TOTAL NET WT(Kg)			
SCALE 1:1	DRAWN	GSM		ALTERATIONS	DATE	SIGNATURE	ALTERATION INDEX
	CHECKED	KSB		DIM 48 WAS 50	290879	A.KUMAR	●
	APPROVED	VC					
	STDS. OFFICER			TRANS. COPY NO.			
	DATE	100393					

 33-116	TYPE	GROUP	OLD DRG.	NEW DRG.
	TITLE		DRAWING No.	
	CLAMP		40-T-50-25962	

20-T-50-22846/04
DRAWING NO.

FOR IS 1875 CL4:HARDEN&TEMPER TO 28 HRc.
FOR IS 1570 13Ni3 Cr80
CASE CARBURISE TO A DEPTH OF 0.8mm &
HARDEN AND TEMPER TO 56-58 HRc.

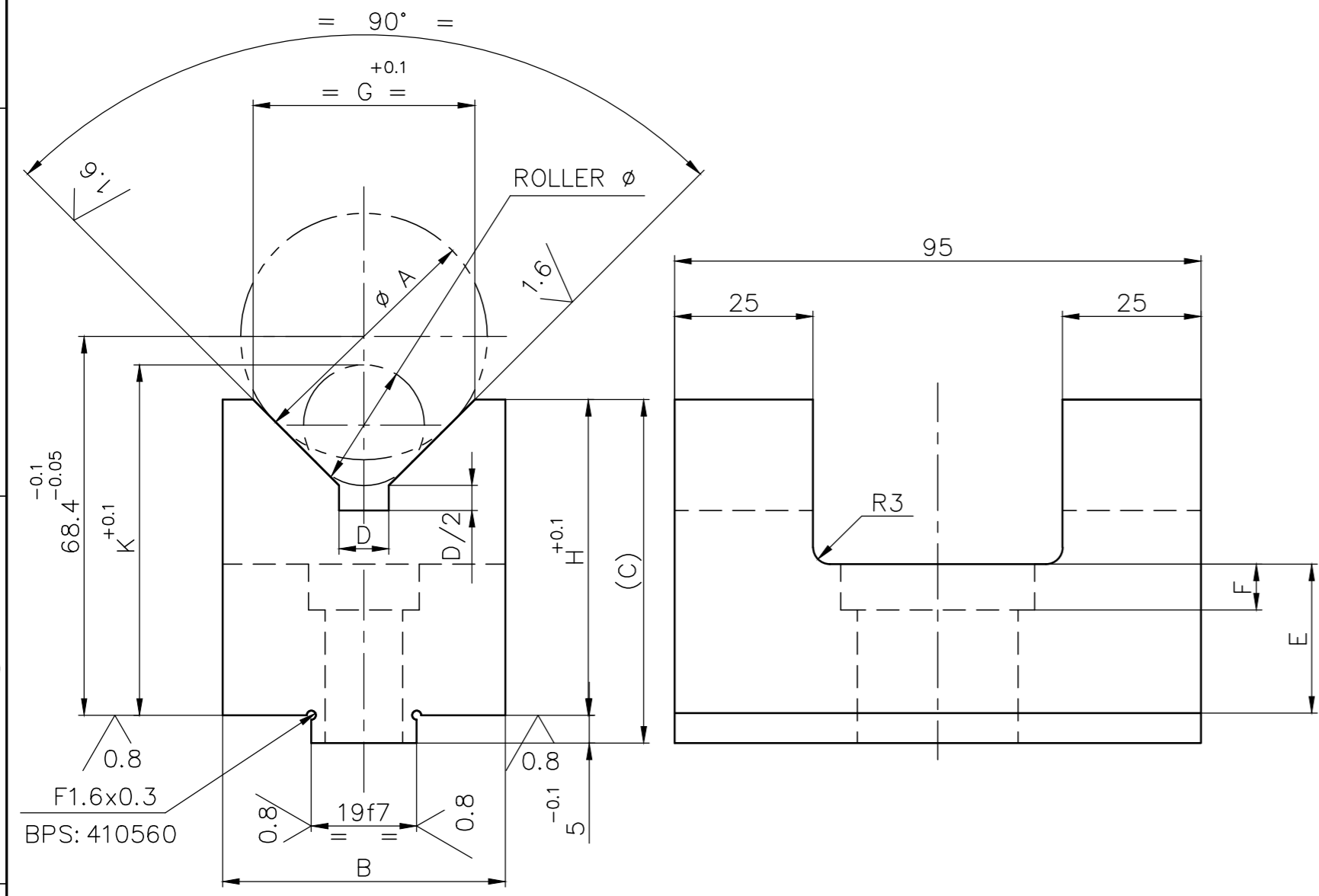
REMOVE SHARP CORNERS. PROFILE END
CUT SCARFING M/C .
REF. DRAWING No. SC.8000.013.

3.2 / 1.6 / 0.8

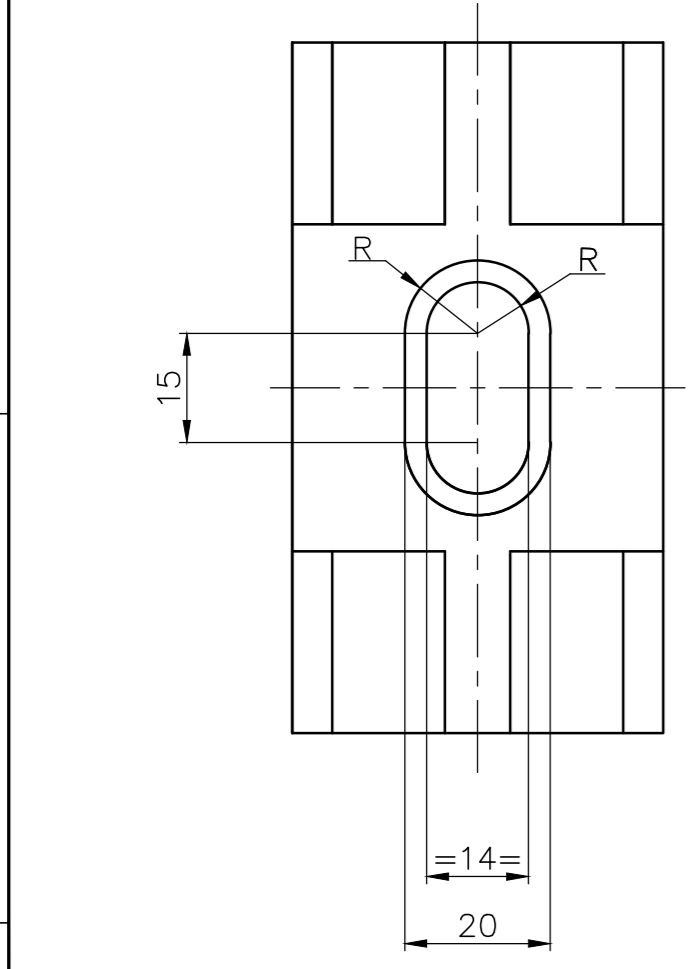
1977 -0.020
-0.041

TOLERANCE FOR UNTOLERANCED DIMENSIONS

UPTO 6 MM = ±0.1 MM
> 6 UPTO 120 MM = ±0.2 MM
MORE THAN 120 MM = ±0.5 MM
ANGULAR TOLERANCE = ±0.5 Deg
CHAMFER = ±0.5 Deg



SL.NO	TOOL NO	TUBE Ø A	B	(C)	D	E	F	G ^{+0.1}	H ^{+0.1}	ROLLER Ø	K ^{+0.1}	Wt	W.C	PARAMETER	DRN	CHD	APPD	DATE
21	50-16465-00	52	52	58	9	30	14	42.74	53	50	92	1.68	5991	05200 xxxx xxx	H.G	N.E	G.S	16.6.12
20	50-16367-00	69.85	70	54 ^{0.4}	25	30	-	60	49	50	79.36	2	5991	06985 xxxx xxx	R.D	N.E	G.S	21.11.11
19	50-16143-00	41.3	45	59.05	10	35	14	29.70	54.05	40	87.48	1.32	5991	0413 xxxx xxx	R.T.S	N.E	G.S	30.01.09
18	50-15779-00	73	73	55	20	14	8	66.44	50	50	77.14	1.6	5991	0730 xxxx xxx	GUNA	GS	GS	
17	50-14983-00	33.7	51	67	8	45	14	34.86	62	36	88.03	1.89	5991	03370 xxxx xxx	SMR	GS	GS	
16	50-14948-00	24	50	70	8	51	14	27.14	65	30	87.64	1.82	5991	02400 xxxx xxx	GSM	GSM	RN	
15	50-14765-00	42	45	63	10	35	14	38.60	58	40	86.98	1.49	5991		SMR	GS	RN	
14	50-14621-00	21.8	48	70	8	53	14	24.03	65	30	89.21	1.75	5991		SMR	GS	GS	
13	50-14620-00	34.2	46	67	9	44	14	35.56	62	50	104.57	1.66	5991		SMR	GS	GS	
12	50-14619-00	48	58	63	10	34	14	47.08	58	50	94.81	1.49	5991		SMR	GS	GS	
11	50-14561-00	35	50	67	8	43	14	36.7	62	50	104.01	1.9	5991		TTV	KAB	V.C	
10	50-14511-00	31.8	51	70	8	45	14	38.17	65	50	106.27	1.78	5991		TTV	KAB	V.C	
9	50-14482-00	60.3	64	60	10	25	8	58.46	55	50	86.12	1.8	5991		TTV	KAB	V.C	
8	50-14130-00	57	64	63	10	28	8	59.8	58	50	88.46	1.69	5991		TTV	KAB	V.C	
7	50-14190-00	38	51	67	9	41	14	40.9	62	50	101.88	1.8	5991		TTV	KAB	V.C	
6	50-10341-00	47.63	51	61	9	34	14	42.6	56	50	95.08	1.62	5991		TTV	KAB	V.C	
5	50-10329-00	76.1	76	54	25	14	8	68.8	49	50	74.94	2.25	5991		TTV	KAB	V.C	
4	50-10328-00	63.5	64	57.15	10	23	6.5	57.3	52.15	50	83.85	1.47	5991		TTV	KAB	V.C	
3	50-10327-00	54	60	59.22	10	30	8	48	54.22	50	90.58	1.75	5991		TTV	KAB	V.C	
2	50-10326-00	51	51	58.3	9	30	14	41.9	53.3	50	92.69	1.71	5991		TTV	KAB	V.C	
1	50-10325-00	44.5	51	62	9	36	14	40	57	50	97.29	1.68	5991		TTV	KAB	V.C	



BxCx95		IS 1570 13Ni3Cr80 IS 1875 CL4		NO. OF PIECES	DESCRIPTION	SEM. PRO/SEQ. NO.	INT. MAT/SEQ. NO.	FINAL MATERIAL	SCRAP SORT	NET WT.(KG)	GROSS WT.(KG)	DRAWING NO	ITEM NO.
COMP.DRG.NO		-		TOOL NO-50-		-00							
COMP. DES.		TUBES		TUBE ØA									
TYPE&GROUP		W.C-5991											

BHARAT HEAVY ELECTRICALS LTD.,
BOILER PLANT UNIT, TIRUCHIRAPALLI-14

FIRST ANGLE.	SCALE	DRAWN	S.SENTHIL	TOTAL NET WT.KG
	NTS	CHECKED	N.ELANGOVAR	TYPE
ALL DIMENSIONS IN MILLIMETRES.		APPROVED	G.SUBRAMANIAN	RETRACED
		DATE	02.04.2009	NEW/OLD DRG NO.
				20-T-50-15760

CAUTION

THE INFORMATION CONTAINED IN THIS DRAWING IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LTD BOILER PLANT UNIT, TIRUCHY-14 AND SHALL NOT BE USED WITHOUT THEIR EXPRESS WRITTEN PERMISSION IN ANY FORM OR PART THEREOF FOR ANY OTHER PURPOSE THAN FOR WHICH IT IS SENT TO YOU.

DRAWING NO. **20-T-50-22846** 04

04	DATE	16.6.12	ALTERED	H.G	CHECKED	N.E	03	DATE	21.11.11	ALTERED	R.DHANVAR	CHECKED	N.ELANGOVAR	02	DATE	02.04.09	ALTERED	S.SENTHIL	CHECKED	N.ELANGOVAR	01	DATE	30.01.09	ALTERED	R.T.SELVARAJ	CHECKED	N.ELANGOVAR
ZONE	SL No: 21 ADDED				ZONE	SL No: 20 ADDED				ZONE	SOFT COPY CREATED				ZONE	SL NO: 19 ADDED											
	DIMENSION 54 MM WAS 49 MM																										

